CHAPTER XIX

# THE HEAT WORK IN OPEN-HEARTH FURNACES

## (a) THE ABSOLUTE HEAT CONTENT OF STEEL AND SLAG.

THE materials are generally brought cold into the furnace. They must be heated to their melting point, melted down, and be brought to the temperature which permits of clean casting of the finished product. The definition of the absolute quantities of heat necessary therefor is quite a complicated problem, the solution of which, however, must be investigated, since only by figures is the possibility presented to appraise the influence of the different factors on the course of the opon-hearth process.

The industry has had placed at its disposal apparatuses which permit of ascertainment with sufficient exactitude of all the temperatures coming into question. Thereby the temperature of castable steel has been fixed at 1,465—1,585° (!., and 1,780—1,788° has been found to be the highest attainable temperature of the flame in open-hearth furnaces. But in order to be able to ascertain from »these temperatures the absolute heat content -which the substances possess at known temperatures, their specific heats must be known, and hove our knowledge exhibits great deficiency. Dipl. Eng. P. Oberhoffer (" Metallurgie," 1907, p. 495) has ascertained the specific heat of pure iron at high temperatures (the metal investigated contained 0*06 per cent. 0, 01)05 por conL I.*, 0*019 per cent. S, and 0*05 per cent. Mn), and found that it in constant between 750° and 1,500° and amounted to ()'l(j(>7. A kilogramme of this iron has thus, at a temperature of 1,500" (at which steel is easily cast), a heat content of 250 calories. The metal investigated, however, was still in the sol::! ?c~ dition, but would at this temperature go over into the fluid condition, so this heat content must be increased |)y the latent heat, of fusion, which according to Wedding amounts to